



Use of TETRA Based Technologies In NPSPAC Spectrum

Briefing to Region 8 RPC

August 28, 2012

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- It is essential that the FCC and its authorized partners such as the RPC's take all steps necessary to protect public safety communications from harmful interference.
- The public safety community must continue to foster and enhance interoperability.
- Harris has a long history of promoting multi-vendor interoperable solutions for public safety through competitive procurement practices – Harris believes in competition.
- The FCC's core strategy is driven by these three principles.

LMR Spectrum Policy and Standards in the U.S.



- U.S. Spectrum Policy and Standards for public safety LMR are aligned along a long-term plan based on 12.5 kHz channel plans
- P25 Phase 1 meets initial FCC requirements for 12.5 kHz spectrum efficiency
- P25 Phase 2 meets ultimate FCC requirements for 6.25 kHz spectrum efficiency
- P25 enables interoperability for trunked and conventional operation – now widely deployed in “general use channels” in VHF, UHF, 700 and 800 MHz
- Mutual aid is the least common denominator method of interoperability – operation in mutual aid channels

- Petition on allowance of TETRA use in U.S.
- Proceeding initiated to assess.
- Concerns among Public Safety, TIA, and manufacturers re: operation in public safety frequencies.
- Limited Waiver Granted for Use in Non-Public Safety Channels.
- Clarification Order: The FCC intent is to “ensure that TETRA equipment would not be operated in the vicinity of public safety systems.”
- Harris supports competition and use of TETRA in non-public safety spectrum.
- Concern of repeating mistakes rebanding taught us.

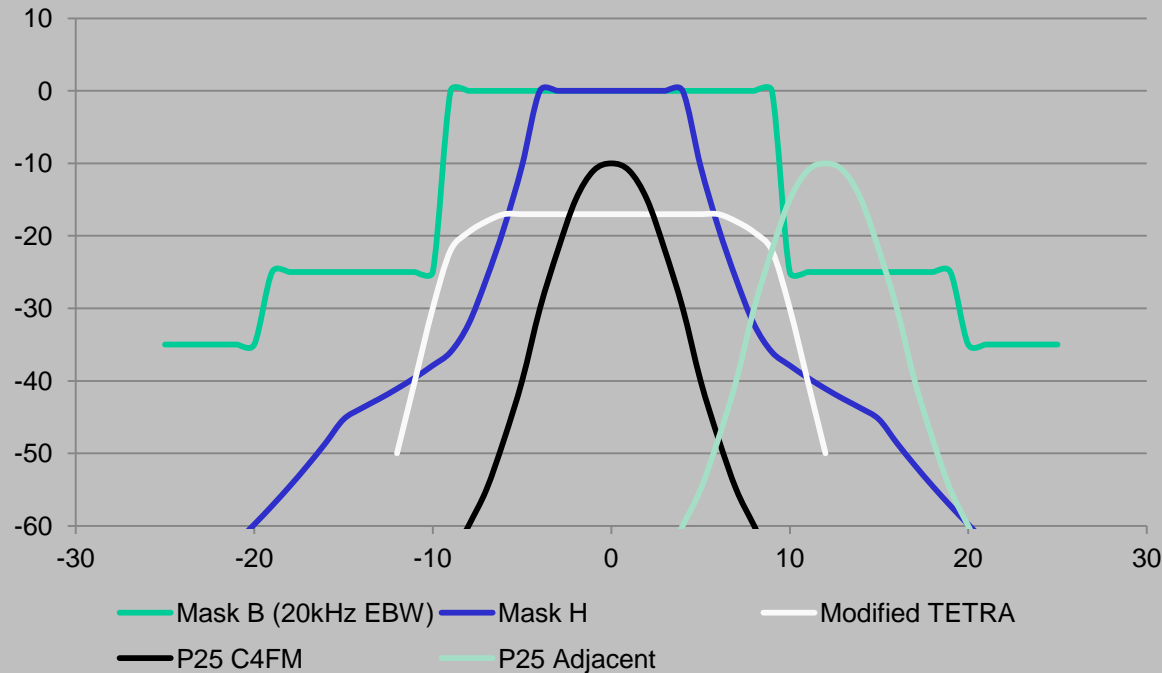
Recent Statement at NPSTC by TETRA Association



- On February 24, 2012, Phil Godfrey, Chairman, of the TETRA Association, addressed the National Public Safety Telecommunication Council (NPSTC) in Las Vegas, NV.
- Mr. Godfrey made clear that TETRA should not ever be deployed in National Public Safety Planning Advisory Committee (NPSPAC) frequencies and 700 MHz public safety frequencies.

- FCC part 90.210 permits type certification in NPSPAC channels with two masks.
- Mask B – used for systems that contain audio filtering.
 - This mask is referenced to the emissions bandwidth of the signal.
 - It is not typically applicable to digitally modulated signals.
 - Certain TETRA-based equipment is based on a modified TETRA waveform enabling it to operate within Mask B.
- Mask H – used for systems that do not contain audio filtering.
 - This mask is independent of emissions bandwidth.
 - It is typically used for digitally modulated signals that include P25.
 - To avoid interference this is the mask that digital systems and TETRA-based equipment must be granted for use in NPSPAC channels.

Comparison of Masks for Modified TETRA and P25 Systems



- Modified TETRA includes spectrum shaping and possibly other techniques that allow this waveform to be certified under Mask B.
- There is considerable energy being radiated into an adjacent P25 channel by TETRA-based waveforms.

- **Interference:** TETRA-based waveforms emit considerable amounts of energy in the two adjacent channels that 12.5 kHz away from the channel center.
 - This will result in significant adjacent channel interference to incumbent P25 systems
- **Frequency coordination:** Under a scenario mixing technologies certified to Mask B (TETRA-based) with technologies certified to Mask H (P25 systems), a much larger exclusion area is necessary for the adjacent channels than a P25 system requires.
 - Having large geographic exclusion zones around TETRA-based transmitters results in considerable loss in actual realized spectrum efficiency.
 - Due to regional planning based on 12.5 kHz center frequencies in the NPSPAC band, in effect a TETRA-based transmitter will require use of $12.5 \text{ kHz} \times 3 = 37.5 \text{ kHz}$ of bandwidth. The benefits of 4 slot TDMA thereby become substantially reduced.
 - When comparing TETRA-based to P25 Phase 2, one then finds that a Phase 2 system is considerably more spectrum efficient than TETRA-based, when deployed in a NPSPAC frequency plan.

- Affirm that pre-existing type certifications are not grand-fathered and that “low power TETRA” and other TETRA-based equipment is not exempt from the Clarification Order’s clear statement that all TETRA equipment and operations are prohibited in public safety frequencies or otherwise in the vicinity of public safety systems.
- Require that digitally modulated signals be certified under the more stringent H-Mask for use in NPSPAC spectrum. This policy should apply to ALL digital technologies, not only to those based on TETRA standards.
- Withdraw the NPSPAC portion of any existing certification for digital equipment that only applied the Mask B when determining compliance in NPSPAC spectrum.
- Affirm that equipment type certified for use in public safety spectrum must also include support for mutual aid channels and equipment type certifications must include these modes of operation.

Harris Filed a Petition for Rulemaking With the FCC to:

- Require, on a technology-neutral basis, digitally-modulated signals be certified under the H-Mask for use in public safety spectrum.
- Pending final resolution of this rulemaking, prohibit any digital technology not meeting the H-Mask emissions requirements from operating in public safety spectrum.
- Make clear that that equipment type certified for use in public safety spectrum must also include support for mutual aid channels, and equipment type certifications must include these modes of operation.
- A Proceeding was initiated by FCC on May 31, 2012; Comments filed July 2, 2012, replies due July 17, 2012.

- “Harris Corporation demonstrates in its letter, however, that ... “low power” TETRA operations could interfere with adjacent channel public safety communications. APCO International agrees with that analysis.... Therefore, we urge the FCC to prevent the introduction of TETRA or other technologies where there is evidence that such equipment could lead to interference to public safety radio communications or harm critical interoperability within public safety spectrum.” *Letter from Gregory Riddle, APCO President, to FCC (March 27, 2012).*
- “[S]ome of the concerns regarding possible interoperability or interference issues with Public Safety incumbents that have been raised by Harris are shared by many in the Public Safety community... the introduction of non-similar communication technologies into the NPSPAC channels could greatly increase the required effort by the relevant regional planning committees to ensure that interference to users occupying adjacent NPSPAC channels in that region is avoided. *Letter from Chuck Powers, Director, Engineering and Technology Policy, Motorola, to FCC (March 30, 2012).*
- “Use of TETRA in the public safety channels should not be approved; TETRA would be especially problematic in the 800 MHz band NPSPAC channels.... Given the environment in the NPSPAC channels, NPSTC believes that TETRA emissions are likely to cause significant adjacent channel interference because of the power contained in the sidebands. Because of historical issues with interoperability, Commission rules for the NPSPAC portion of the 800 MHz band established five mutual aid interoperability channels and require equipment certified and marketed for public safety operation to have the capability to be programmed on those mutual aid channels.... We understand that TETRA does not provide an analog voice capability, which would prevent use of the mutual aid interoperability channels. NPSTC urges the Commission to consider these adjacent channel interference and interoperability issues in taking further action in this proceeding. *Letter from Ralph Haller, Chair, NPSTC, to FCC (April 10, 2012).*
- “Adjacent channel interference between the overlapping channels is minimized through geographic base stations separation, regional planning, and more stringent technical standards such as reduced carrier deviation and tighter out-of-band emission limits. Because the regional planning process takes these standards into account, allowing digital technologies into the NPSPAC band under different emissions masks could have an impact on both the interference potential and spectrum efficiency within the band. At a minimum, it could increase the effort by each regional planning committee to address interference risks for adjacent users.” *Comments of Motorola to FCC on Harris H Mask Petition (July 2, 2012).*

This is About Protecting First Responders -Not Stifling Competition



- Harris is the lead manufacturer calling for competition in the public safety communications market.
- Some have argued that Harris is taking this position to stifle competition.
- This assertion is based upon the flawed presumption that Harris does not have a B-Mask capable technology that could operate under Commission rules as interpreted by some vendors.
- Harris and other companies offer numerous technologies that are compatible with the B-Mask.
- To avoid the interference inevitable resulting from the utilization of B-Mask digital technologies in either Public Safety or Business and Industrial spectrum, Harris and other manufacturers have chosen to certify digital equipments against the C, D, E, H, or G masks appropriate for digital equipment.
- Harris is unaware of any manufacturer, other than PowerTrunk, offering B-Mask only certified digital equipment for utilization in Public Safety spectrum, and for that matter Business and Industrial spectrum.
- In the event that RPCs and the FCC the Commission fail to require responsible industry practice and mandate inclusion of a least common denominator technology for operation on designated public safety interoperability/mutual aid channels, there likely will be an exponential rise in cases of unacceptable interference to public safety operations and an unacceptable decrease of interoperability.

- We hope RPCs will consider the impact introducing TETRA-based technologies into NPSPAC channels will have on:
 - Future FCC Rulings now that a proceeding has been initiated
 - Interoperability
 - Efficiency of spectrum resources and frequency coordination
 - Interference
- We value your input, and are available to address any questions.
- Thank you for your time.